

REMARKS

The Examiner's Action mailed on December 12, 2007, has been received and its contents carefully considered. Additionally attached to this Amendment is a Request for Continued Examination, together with the requisite fee.

In this Amendment, Applicant has amended claims 1 and 6. The subject matter of claim 27 has been amended into independent claim 1, so that claim 27 has now been canceled. Claims 28 and 29 have been added. Support for claims 28 and 29 can be found from at least original Figure 2B, which clearly shows this claimed feature. Claims 1, 6 and 23 are the independent claims, and claims 1, 4-10, 21-25, 28 and 29 are pending in the application. For at least the following reasons, it is submitted that this application is in condition for allowance.

Initially, it is noted with great appreciation that the Examiner considers claims 23 and 24 as being allowed. However, for the reasons that will be subsequently explained, it is also submitted that the remaining claims are also patentably distinguishable over the art of record.

The Examiner's Action has rejected claims 1, 2, 4-10, 21, 22, 25 and 27 as being obvious over *Kim* in view of *Koike*, *Fournel*, and further in view of *Mizuno*. It is submitted that these claims are all *prima facie* distinguishable over the cited references, for at least the following reasons.

A disclosed by Applicant's specification, in paragraphs 12 and 15, it is disclosed that:

According to the present invention, the second conductive region (disconnection region) 18 may be disconnected selectively and reliably, because electric current tends to be concentrated on the second conductive region 18. As a result, a fuse circuit can be designed small in size on a semiconductor substrate.

In operation, when a predetermined voltage is applied between the electrode pads 14a and 14b, electric current flows through the conductive line (16 & 18). When a predetermined amount of electric current through the second conductive region 18, the region 18 is melt and disconnected.

As noted in Applicant's last-filed Amendments, the subject matters of which are incorporated herein by reference, neither *Kim*, nor *Koike*, nor *Fournel*, disclose or otherwise suggest Applicant's claimed semiconductor device which has a multi-layered structure in which a second conductive region melts when a current exceeds a threshold level. Instead, each of these references teaches that fuses are blown through the respective windows, using lasers, for examples.

The Action also relies on the teachings of *Mizuno*. However, *Mizuno* discloses a semiconductor integrated circuit which includes a single layer TaN 15

which is used as a fuse, and which extends between aluminum pads 16 (Al layer), and which are disposed on an SiO layer 14, as shown in figure 2. The TaN layer 15 functions as a barrier metal layer for the Al layers 16, as discussed paragraph No. 0043. The TaN layer 15 and the Al layer 16 are layered directly, without any insulating layers therebetween. Thus, *Mizuno* does not disclose or suggest a multi-layered structure, in which a plurality of metal layers are layered with respective insulating layers therebetween, as recited in claims 1, 6 and 23. *Mizuno* merely describes a single layer metal wiring.

This reference also discloses that a glass coating layer 17 can be formed over the TaN layer 15, as well as over the aluminum pads 16. A previous Examiner's Action contended that this TaN layer 15 together with the glass coating layer 17 constitutes a more layered section, and contended that this disclosure overcomes the deficiencies of the other cited references. However, it is noted that Applicant's independent claim 1 specifically recites that the first conductive region, which is the multi-layered structure, includes a plurality of conductive layers with an insulating layer disposed therebetween. Even assuming *arguendo* that the layer 17 and the layer 15 could be construed as a multi-layered structure, this so-called multi-layered structure is not equivalent to Applicant's claimed multi-layered structure, as it does not comprise a plurality of conductive layers having an insulating layer disposed therebetween.

Furthermore, it is respectfully submitted that one skilled in the art presented with the teachings from this reference, would not view the layer 17 and the layer

15 as being a multi-layered structure in the manner recited by Applicant's independent claim 1. That is, this reference specifically recites that it is important that the TaN layer be a single layer (see column 3, paragraph number 46). Thus, not only does this reference not disclose or suggest Applicant's claimed multi-layered structure, which comprises a plurality of conductive layers and an insulating layer disposed in between, but this reference specifically teaches away from such a configuration, due to the importance of the fuse being a single layer, as discussed in this reference. As such, it is respectfully submitted that there would have been no motivation to have combined the teachings from these references in the manner proposed by the Examiner's Action, and it is thus submitted that Applicant's independent claim 1, and the claims dependent therefrom, are patentably distinguishable over the cited references.

Furthermore, Applicant's independent claim 6 is submitted to be *prima facie* patentably distinguishable over the cited references for at least the following additional reasons.

This claim recites, *inter alia*, that a length of the second conductive region along the conductive line is formed to be not larger than double a narrowest width of the conductive line in the second conductive region. The Action now relies on the configuration shown in Figure 3B in support of this rejection. However, Figure 3B is a top-down view, which includes a metal layer 16 on top of the TaN layer 15. Metal layer 16 is shown as including right- and left-hand portions, each having a respective pad P1 and P2. However, in order to even come close to reading upon

claim 6, then the region of the TaN layer 15 between the right- and left-hand portions of the metal layer 16 would need to be construed as being a second conductive region. However, as is clear from the drawing, the length of this so-called second conductive region is almost 3 times the width of the TaN layer 15. This is substantially longer than the length permitted by claim 6.

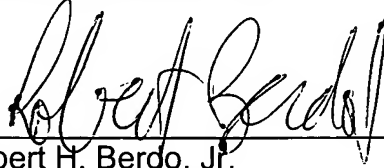
Further, the Action also relies on the feature 101 shown in Figure 5B of *Mizuno* as teaching this claimed feature. However, it is respectfully brought to the Examiner's attention that Figure 5B is a prior art configuration, and has nothing to do with the configuration shown in Figures 1 and 2 of *Mizuno*. For example, *Mizuno* teach that the black-box feature 101 is a PN junction (see paragraph No. 0007); however, there is nothing from this disclosure to suggest that this PN junction is a second conductive region, as recited claim 6, that has a length to be not larger than a double width of a conductive line, together with the additional added recitations in claim 6. As such, it is respectfully submitted that Applicant's independent claim 6 is patentably distinguishable over the cited references. It is thus requested that this claim, and the claims dependent therefrom, also be allowed.

It is submitted that this application is in condition for allowance. Such action and the passing of this case to issue are requested.

Should the Examiner feel that a conference would help to expedite the prosecution of this application, the Examiner is hereby invited to contact the undersigned counsel to arrange for such an interview.

Should the remittance be accidentally missing or insufficient, the Director is hereby authorized to charge the fee to our Deposit Account No. 18-0002.

Respectfully submitted,



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Date

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